

C L A I M S

1. An expandable tubular element having a wall including at least a portion formed of a plurality of stacked wall layers, each wall layer having a bent configuration in a cross-sectional plane prior to radial expansion of the tubular element and being arranged to deform from the bent configuration to a more stretched configuration upon radial expansion of the tubular element.
- 5 2. The expandable tubular element of claim 1, wherein said wall layers have mutually different bending curvatures prior to radial expansion of the tubular element.
- 10 3. The expandable tubular element of claim 1 or 2, including a plurality of said portions of stacked wall layers spaced along the circumference of the tubular element.
- 15 4. The expandable tubular element of claim 1 or 2, wherein said portion of stacked wall layers extends along the full circumference of the tubular element.
- 20 5. The expandable tubular element of claim 4, wherein the tubular element has, prior to radial expansion thereof, a corrugated shape.
- 25 6. The expandable tubular element of any one of claims 1-5, wherein the tubular element is one of a pair of tubes whereby an end part of an inner tube extends into an end part of an outer tube, and wherein said portion of stacked wall layers is included in one of said end parts.

7. The expandable tubular element of claim 6, wherein said portion of stacked wall layers is included in the end part of the outer tube.

5 8. The expandable tubular element of any one of claims 1-7, wherein the tubular element includes at least one cavity, each cavity being formed between a pair of adjacent wall layers prior to expansion of the tubular element, said cavity containing a body of fluid.

10 9. The expandable tubular element of claim 8, wherein said fluid forms a lubricant or coating to promote sliding of said adjacent wall layers along each other during expansion of the tubular element.

15 10. The expandable tubular element of claim 8 or 9, wherein at least one of said adjacent wall layers is provided with an opening arranged to allow fluid from said body of fluid to be expelled from the cavity during expansion of the tubular element.

20 11. The expandable tubular element of claim 10, wherein said fluid forms a bonding agent or a compound for forming a bonding agent, which bonding agent is suitable to bond said adjacent wall layers to each other or to bond the tubular element to a wall extending adjacent the tubular element.

25 12. The expandable tubular element of claim 11, wherein said wall is the wall of another tubular element or the wall of a wellbore into which the tubular element extends.

30 13. The expandable tubular element of any one of claims 10-12, wherein said cavity forms a first cavity containing a first bonding compound for forming a bonding agent, and wherein a second said cavity contains a second compound which reacts with the first compound to form the bonding agent.

14. The expandable tubular element of any one of  
claims 1-13, wherein the tubular element extends into a  
borehole formed in an earth formation.

5 15. The expandable tubular element substantially as  
described hereinbefore with reference to the drawings.

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 27 SEP 2004

PCT

Applicant's or agent's file reference TS 6300 PCT	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/08843	International filing date (day/month/year) 08.08.2003	Priority date (day/month/year) 08.08.2002
International Patent Classification (IPC) or both national classification and IPC E21B43/10		
Applicant SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
  - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.



EPO - DG 1

01.11.2004

3. This report contains indications relating to the following items:

(107)

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  04.03.2004	Date of completion of this report  27.09.2004
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer  van Berlo, A  Telephone No. +31 70 340-3535  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/EP 03/08843**

**I. Basis of the report**

1. With regard to the elements of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

**Description, Pages**

1-7 as originally filed

**Claims, Numbers**

1-12 received on 20.07.2004 with letter of 20.07.2004

**Drawings, Sheets**

1/1 as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-12
	No: Claims	
Inventive step (IS)	Yes: Claims	1-12
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-12
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/EP 03/08843

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

D1: WO 01/20125 A

D2: EP-A-1.152.120

1. In light of the documents cited in the international search report and in light of the subsequent amendments made by the applicant, it is considered as obvious that the invention as claimed in the independent claim 1 meet the criteria mentioned in Article 33(1) PCT, i.e. they appear to be novel, to involve an inventive step and to be industrially applicable.

2. The document D1, which is considered to be the closest prior art, discloses, in particular in figures 1-7 and claim 15 (the references in parentheses applying to this document):

An expandable tubular element (10) having a wall including at least a portion formed of a plurality of stacked wall layers (inner halves and outer halves of tubes 14 or of 52), each wall layer having a bent configuration in a cross-sectional plane prior to radial expansion of the tubular element (figures 1, 3, and 5-7) and being arranged to deform from the bent configuration to a more stretched configuration upon radial expansion of the tubular element (figure 2, 4), wherein the tubular element includes at least one cavity (space within tubes 14), each cavity being formed between a pair of adjacent layers prior to expansion of the tubular element, said cavity containing a body of fluid.

The document D1 does not disclose that:

said cavity contains a fluid in the form of a bonding agent or a compound for forming a bonding agent, which bonding agent is suitable to bond said adjacent layers to each other or to bond the tubular element to a wall extending adjacent the tubular element.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The use of bonding agents with expandable tubulars is known, see for example D2. It is however not obvious to fill the cavities known from D1 with the bonding agent for bonding of the wall layers to each other in order to improve the collapse strength of the

**INTERNATIONAL PRELIMINARY**

International application No. PCT/EP 03/08843

**EXAMINATION REPORT - SEPARATE SHEET**

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tubular element.

The subject-matter of claim 1 is therefore considered inventive (Article 33(3) PCT).

**OTHER REMARKS:**

- The independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

- No documents reflecting the prior art, such as D1 and D2, are identified on pages 1-3 in the description (Rule 5.1(a)(ii) PCT).

- The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).



20. 07. 2004

(79)

TS 6300 PCT

A M E N D E D   C L A I M S

1. An expandable tubular element having a wall including at least a portion formed of a plurality of stacked wall layers, each wall layer having a bent configuration in a cross-sectional plane prior to radial expansion of the tubular element and being arranged to deform from the bent configuration to a more stretched configuration upon radial expansion of the tubular element, wherein the tubular element includes at least one cavity, each cavity being formed between a pair of adjacent wall layers prior to expansion of the tubular element, said cavity containing a body of fluid in the form of a bonding agent or a compound for forming a bonding agent, which bonding agent is suitable to bond said adjacent wall layers to each other or to bond the tubular element to a wall extending adjacent the tubular element.
2. The expandable tubular element of claim 1, wherein said wall layers have mutually different bending curvatures prior to radial expansion of the tubular element.
3. The expandable tubular element of claim 1 or 2, including a plurality of said portions of stacked wall layers spaced along the circumference of the tubular element.
4. The expandable tubular element of claim 1 or 2, wherein said portion of stacked wall layers extends along the full circumference of the tubular element.
5. The expandable tubular element of claim 4, wherein the tubular element has, prior to radial expansion thereof, a corrugated shape.